

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Climate Change - Home, Garden and Environment

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	20%		20%	
111	Conservation and Efficient Use of Water	20%		20%	
131	Alternative Uses of Land	20%		20%	
205	Plant Management Systems	20%		20%	
721	Insects and Other Pests Affecting Humans	20%		20%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	3.2	0.0
Actual Paid Professional	19.6	0.0	11.6	0.0
Actual Volunteer	2418.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
499395	0	541153	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1386617	0	3713666	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
288828	0	2581709	0

## **V(D). Planned Program (Activity)**

### **1. Brief description of the Activity**

Identify critical programmatic foci/needs based on Extension and stakeholder assessment broadly defined under two areas:

- Environmentally sound gardening/lawn care
- Home horticulture-lawn, garden and grounds management
- Commercial horticulture - professional management and maintenance
- Environmentally sound household, structural pest control
- Home pest control-termites, carpenter ants,, etc.
- Human-health related pest control-bed bugs, mosquitoes, ticks, etc.
- A school IPM program will be developed to train end-users sound management techniques,

Develop an inventory of local (county based) and regional and statewide programs designed to meet these needs. Identify team members and their roles. Create a multi-task effort to generate and share research-based information with clientele, including research, demonstrations, educational meetings and workshops, certification programs, trainings, etc. Research on plant cultivars that exhibit increased disease and insect resistance , as well as reduced need for fertilizer and irrigation water, will lead to reduced dependence on chemical control of pests and disease, lessening the impact on the environment.

### **2. Brief description of the target audience**

Stakeholders:

- Homeowners and residential clientele
- Commercial horticulture professionals (management and maintenance)
- Commercial pest control operators
- Public health officials
- Local environmental commissions or others that have interest in these areas
- Municipalities and other governmental and non-governmental agencies, including Parks

Commission, Public Health, Mosquito Commission, schools, etc.

- Volunteers (trained via Master Gardener Program, Environmental Stewards Program), youth and others who can support and benefit from these efforts
- Underserved and underrepresented audiences

### **3. How was eXtension used?**

Livestock Poultry Environmental Learning Center  
Animal Manure Management  
Bee Health

Faculty answered ask an expert questions.

## **V(E). Planned Program (Outputs)**

### **1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	396	492	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**  
**Patent Applications Submitted**

Year: 2012  
 Actual: 17

**Patents listed**  
 61-679,810

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2012	Extension	Research	Total
<b>Actual</b>	12	97	109

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation data will be collected.

Year	Actual
2012	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increased knowledge and improved decision making skills of professionals and volunteers (Master Gardeners and Environmental Stewards) working in commercial horticulture professions (management and maintenance), commercial pest control operators, public health officials, municipalities and other governmental and non-governmental agencies. Increased number of trained youth and adult volunteers, and measurable impact of their assistance on clientele. Increased number of certified pest control operators. Increased number of youth and adult clientele utilizing Extension information and service to improve their own and others knowledge and decision making skills.
2	Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
3	Long Term - New Jersey's residents will reside, work and play in a healthy, safe, and sound environment-in their homes, gardens, schools, parks and workplaces.
4	4-H Environmental Ambassador Program - Waste Management and Environmental Conservation: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
5	Involving Youth in the Improvement of their School Grounds: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
6	Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward Program: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
7	Earth-wise Lawn and Landscape Care Educational Program: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge

	and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
8	Sustainable Residential Landscapes in Salem and Cumberland Counties: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
9	Green Infrastructure for Municipal Officials: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
10	Forest Stewardship: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

**Outcome #1**

**1. Outcome Measures**

Short Term - Increased knowledge and improved decision making skills of professionals and volunteers (Master Gardeners and Environmental Stewards) working in commercial horticulture professions (management and maintenance), commercial pest control operators, public health officials, municipalities and other governmental and non-governmental agencies. Increased number of trained youth and adult volunteers, and measurable impact of their assistance on clientele. Increased number of certified pest control operators. Increased number of youth and adult clientele utilizing Extension information and service to improve their own and others knowledge and decision making skills.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

{No Data Entered}

**What has been done**

{No Data Entered}

**Results**

{No Data Entered}

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

**Outcome #2**

**1. Outcome Measures**

Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Animal Waste Management Law Education

As of March of 2009, the state of New Jersey passed a law that requires all livestock farms, regardless of number of animals, as well as those who handle manure, to proactively address and manage non-point source pollution that may originate from livestock operations.

**What has been done**

In 2012, Animal Waste Management Workshops were conducted by Rutgers Cooperative Extension of Salem County employees where producers were guided through the process of creating their Animal Waste Management Plan (AWMP). By the end of the session, the producers were able to complete a declaration page and file their AWMP so that they were in compliance with the state rule.

**Results**

As of year-end 2012, there are approximately 1,000 declaration pages collected by the New Jersey Department of Agriculture (NJDA), meaning there are 1,000 animal waste management plans in effect.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

### **Outcome #3**

#### **1. Outcome Measures**

Long Term - New Jersey's residents will reside, work and play in a healthy, safe, and sound environment-in their homes, gardens, schools, parks and workplaces.

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

#### **3a. Outcome Type:**

Change in Condition Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

{No Data Entered}

##### **What has been done**

{No Data Entered}

##### **Results**

{No Data Entered}

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #4**

### **1. Outcome Measures**

4-H Environmental Ambassador Program - Waste Management and Environmental Conservation: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

4-H Environmental Ambassador Program - Waste Management and Environmental Conservation

Society is faced with issues related to the disposal and management of solid waste. It is vital to address these issues and concerns effectively and efficiently while maintaining a balance among the environment, human health and economic benefits. There are no in-depth environmental and waste management programs for youth in 5th-7th grades. Today's young people, as the future leaders and inhabitants of our earth, must be empowered to take action to address these issues and create needed changes.

#### **What has been done**

The 4-H Environmental Ambassador Program is a 3 day/2 night educational opportunity for youth in grades 5-7 from a three county region in the southern part of New Jersey to study waste management and environmental conservation. Participants become environmental ambassadors in their schools and communities and are responsible for organizing and implementing environmental projects.

The program brings waste management alternatives and environmental issues to life through a variety of activities that utilize experiential, inquiry-based and cooperative learning techniques. Participants learn about alternatives such as recycling, landfilling, incineration, source reduction

and composting. The program also emphasizes careers in the field of waste management and how everyone can have an impact on the environment by handling trash effectively.

### **Results**

This annual program, which in 2012 completed the 14th year, was recently recognized with the 2012 National Association of Extension Agents Natural Resources and Environmental Education Award.

Evaluation data for 2012 revealed the following results: 100% of the youth and adults increased their scores from the pre-test to post-test by an average of 39%, 85% of the program participants self-reported an increase in knowledge of waste management alternatives, and 98% of the participants indicated that they would recommend this program to other students in their school.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

### **Outcome #5**

#### **1. Outcome Measures**

Involving Youth in the Improvement of their School Grounds: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

#### **3a. Outcome Type:**

Change in Action Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Involving Youth in the Improvement of their School Grounds

School grounds in Union County need more trees ? to make shade (protects against skin cancer), to help fight asthma (filter particulate matter out of the air), and to add beauty to the lives of county residents. Involving children in these efforts provides them with valuable leadership and stewardship skills.

#### What has been done

In 2012, 4-H trained 70 students from 35 different schools on how to plant and care for trees. These 70 students then proceeded to plant \$2,000 worth of shade trees on their school property. In the process of planting and caring for the trees, they involved an additional 1,000 students.

#### Results

\$2,000 worth of trees were planted. Publicity for the importance of planting trees was generated in several Union County communities enhancing youth stewardship skills and having a sustainable impact on the environment.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

### Outcome #6

#### 1. Outcome Measures

Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward Program: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward Program

According to surveys, Union County needs more trees ? to make shade in order to protect against skin cancer, to help fight asthma (trees filter particulate matter out of the air), and to add beauty to the lives of county residents. Involving children in all these efforts provides them with valuable leadership skills.

#### What has been done

The 4-H Master Tree Steward Program is a volunteer program. 4-H trains adults in tree biology and care. Once trained, the volunteers use a specially designed curriculum with hands-on activities to teach school-aged children about trees.

#### Results

A sampling of 226 students showed that as a result of the Rutgers/4-H Class on Tree Appreciation: 71% said they were less likely to damage trees, 90% said they were more likely to take better care of trees around their homes, 86% said they were more likely to take better care of trees around their schools, 70% said they will observe trees more closely, 69% said they are more likely to plant a tree, 98% said they learned that there are many different kinds of trees, 84% said they were more likely to stop others from damaging trees, 78% said they want to learn more about tree care and planting, 83% said they will tell someone about what they learned.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #7**

### **1. Outcome Measures**

Earth-wise Lawn and Landscape Care Educational Program: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Earth-wise Lawn and Landscape Care Educational Program

Over the past 10 years, surveys conducted during Master Gardener training in Middlesex and other counties throughout New Jersey to over 300 students, indicate that 95% of participants would like to reduce or eliminate pesticide use, fertilizer, water use and other unnecessary inputs to their landscapes.

#### **What has been done**

"Earth-wise Lawn and Landscape Care", the three hour comprehensive class covers the proper selection and care of landscape plants in order to keep plants healthy and reduce the need for unnecessary pesticide, fertilizer and irrigation applications was presented by the agricultural agent.

The presentation references current research on the selection, care and maintenance of landscape plant and covers applied renovation and pruning techniques that can help to maintain plant vigor. The presentation provides details on how to replace the majority of pesticide use with proven best management practices and biological or alternative control methods for insects, disease and weed pests.

## Results

A total of 253 students received training in 10 classes throughout the state in 2012. Surveys indicate a total of 60 acres of lawns and landscapes were managed by students in the program. (Individual lawn size averaged between 1/4 and 1/5 of an acre) projections were based on students completing the surveys.

80% of total students committed to recycling grass clippings back to 60 acres. This would reduce the need for 1 pound of fertilizer application per lawn or 1 pound of actual nitrogen per 1,000 square feet for a reduction of 2,090 pounds of Nitrogen total.

Based on the energy needed to produce Nitrogen fertilizer per pounds, this results in a savings of 70 million BTU's of energy or a reduction of equivalent #2 fuel oil diesel equivalent of 501 gallons.

Reduce over 18 million gallons of unnecessary water use for July and August alone. 78% of students reported that they would now irrigate in early morning and only as needed for a reduction on 1 acre inch of water per week on 47 acres. If we estimate one less irrigation per week at 1 inch per acre during the months of July and August then we could reduce 2,350,000 gallons per irrigation or 18,800,000 gallons for 8 applications during July and August.

Reduction of 31,363 pounds of grass clippings or 15.68 tons 80% of participants committed to recycling grass clippings on 48 acres of the total 60 acres. Based on an average of 75 lbs of grass clippings generated by an average 5,000 square feet lawn, participants will reduce 31,363 pounds of grass clippings or 15.68 tons. This could result in a savings in landfill tipping fees of over \$2,000 and solid waste management.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## Outcome #8

### 1. Outcome Measures

Sustainable Residential Landscapes in Salem and Cumberland Counties: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Sustainable Residential Landscapes in Salem and Cumberland Counties

The landscapes of Salem and Cumberland Counties include a mix of agricultural, urban, and suburban land uses. There are therefore a diversity of water users and a variety of non-point source pollutants to local waters. Several lakes and streams in the area have been designated as impacted by state regulators, and two watersheds are considered priority watersheds for restoration by the state of New Jersey. Addressing these concerns necessitates education of stakeholder groups not traditionally possessing a high degree of expertise in land management such as homeowners and municipalities. In a larger sense, conserving potable water and preventing water pollution are essential to preserving agricultural productivity, and hence food security, as well as preserving water resources for drinking water, business use, recreation, and wildlife.

#### What has been done

The education program designed to address these needs was multifaceted. Four short workshops were held covering the topics of environmentally-friendly lawn care, soil quality and runoff, pond maintenance for a healthy environment, and outdoor water conservation in residential landscapes. In addition, four additional formal presentations were made to a newly formed watershed association in the state-designated priority watershed in Cumberland County. Along with these, a scripted slideset was composed to educate about fecal contamination in waterbodies, and made available to stakeholders online. Also, a 30-page Extension bulletin on outdoor water conservation was composed and made available to the public online and through Extension county offices. Additional outreach efforts included newspaper articles, newsletter articles, blog posts, and poster displays at local county fairs.

#### Results

This programming successfully resulted in knowledge gain and the expectation of behavior change among program participants. Program evaluations from the workshops indicated a knowledge gain from participants, for example with self-reported understanding of topics from the soil quality and runoff class increasing from an overall average of 2.9 out of 5.0 to 4.2 out of 5.0. Likewise, self-reported knowledge in the pond maintenance class increasing from an overall average of 2.6 to 4.8. Changes in behaviors are expected to result from these programs as well. For example, in the soil quality in runoff class, 92% of participants said they would test their soil

and improve their soils for environmental quality, and 62% said they would use what they learned to educate others. The work with the local watershed association is expected to have lasting results on the environment.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

#### Outcome #9

##### 1. Outcome Measures

Green Infrastructure for Municipal Officials: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	0

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Green Infrastructure for Municipal Officials

Much of Essex and Passaic Counties are highly urbanized with numerous stormwater and combined sewer issues. A combined sewer system is one in which there is one pipe that handles both wastewater and stormwater. During dry weather, the sewage flows to the wastewater

treatment plant with no issues, but during wet weather, the system can become overwhelmed and the combined sewage and stormwater is often discharged untreated to a local waterbody. This event is called a combined sewer overflow and poses a risk to both human health and to the water quality of the receiving waterway.

**What has been done**

Two seminars called "Stormwater Management Techniques for Runoff Reduction" with demonstrations of permeable pavement and rain gardens were presented to municipal engineers, officials, and other interested parties. Over 80 municipal, county, and state representatives attended this event.

Permeable pavement is a stormwater management system with a surface that allows water to pass through into an underlying storage layer. This stormwater best management practice provides both water quantity control and water quality improvement, while serving a practical purpose with a surface that is able to be driven, parked, or walked upon. This initiative was undertaken due to the major flooding and stormwater impacts with which the two counties often grapple and efforts were increased in the aftermath of Hurricane Irene in 2011.

The seven rain gardens in four Passaic County municipalities are capturing and treating more than 114,000 gallons of runoff per year, and capturing suspended soils, phosphorus and nitrogen that can have negative impacts on water quality and natural ecosystems.

**Results**

The City of Newark has committed to a new 700 ft<sup>2</sup> permeable pavement sidewalk installation (Goodwin Ave.) and the project is currently out to bid. This installation will be able to intercept and infiltrate up to 7,800 gallons of runoff per storm event. The East Orange VA Hospital installed a new 1440 ft<sup>2</sup> permeable pavement sidewalk installation. This installation will be able to intercept and infiltrate up to 16,150 gallons of runoff per storm event. Passaic County recently committed to a Green Streets Initiative that includes permeable pavement and is in the beginning stages of designing permeable pavement systems for 2 locations in Paterson.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

**Outcome #10**

**1. Outcome Measures**

Forest Stewardship: Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health

related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

## 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Forest Stewardship

Almost one hundred and twenty thousand landowners own approximately 1.3 million acres of forestland in New Jersey, yet less than 12 percent of those owners actively manage their forestlands. Because of increasing developmental pressures and the increasing value of the state's forests for open space, water, wildlife, and quality of life as well as traditional forest products, it is more important than ever that these private lands are actively and sustainably managed.

#### What has been done

The Extension Specialist conducted 6 presentations and evening programs, and two field days on forest stewardship for private, nonindustrial forest landowners. The third New Jersey Woodlands Stewards Program was conducted, a three-day program that graduated the third class of trained volunteers. Assistance was also provided for planning and conducting the annual Tree Farm Day.

One twilight meeting was conducted for Christmas tree growers. Two presentations on shearing, accompanied by a demonstration, were presented at the twilight meeting and at the NJ Christmas Tree Growers Association's annual summer meeting. Four online newsletters were published for woodland stewards and one newsletter for Forest Stewardship woodland owners was published.

#### Results

With the average size of forestland ownership in New Jersey of 15 to 20 acres, some 5,535 to 7,380 acres have benefited from more knowledgeable landowners, subsequent better management, and a higher likelihood of remaining forested. The potential impact of the 10 volunteers of the third graduating class of the New Jersey Woodland Stewards Program is significant: each volunteer is expected to spend 30 hours over the coming year promoting forestry in New Jersey. At the federal volunteer rate of \$20.85/hour for volunteer time, their efforts will be valued at over \$6,255.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

See Qualitative Outcomes

##### Key Items of Evaluation

See Qualitative Outcomes